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DERWENT-WEEK: 199609

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TITLE: Manufacturing procedure for furniture panels -  
comprising cutting out from sheet of medium-density  
fibres, veneering, colouring and sealing, using automated  
processes

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BE 1004096 A6	September 22, 1992	N/A	019	B27D 000/00
IE 66459 B	December 27, 1995	N/A	000	B27M 003/18
GB 2259886 A	March 31, 1993	N/A	026	B27M 003/18
GB 2259886 B	May 11, 1994	N/A	000	B27M 003/18

INT-CL (IPC): B27D000/00, B27M003/18, E06B000/00

ABSTRACTED-PUB-NO: BE 1004096A

BASIC-ABSTRACT:

The manufacturing procedure for a furniture panel consists of cutting out the panel from a sheet with medium-density fibres to the required dimensions, covering its outer faces with veneer applied with adhesive and heated under pressure, removing excess material, smoothing the outer edges, colouring any machined portions to harmonise with the veneer, and applying a sealant and polish before drying. The procedure also includes the production of a design (12, 14) on the face of the panel by cutting grooves with a milling tool, or cutting out an aperture e.g. for a mirror.

The various stages of the manufacturing procedure can be carried out

automatically, using a machine which shapes and veneers the panels, colours, polished and dries them.

USE/ADVANTAGE - E.g. for making a door or a mirror. Increased automation of manufacturing processes.

ABSTRACTED-PUB-NO: GB 2259886B

#### EQUIVALENT-ABSTRACTS:

A furniture mfg. method comprising the steps (a) cutting one or more sheets of medium density fibre **board** to form a panel or panels of a pre-set desired size; (b) applying sheets of veneer to outer faces of each panel, the veneer sheets being attached to each panel with adhesive and heated under pressure for a preset period to cure the adhesive securely bonding the veneer sheets to the panel; (c) trimming away excess material from each panel; (d) machining each panel by profiling at least portion of a peripheral edge of the panel and/or shaping a front face of the panel; (e) sanding the profiled edge of each panel with a rotary **sanding device having a grinding** face shaped to correspond to the profiled edge of the panel; (f) delivering the panels for assembly into furniture pieces; (g) staining exposed machined portions of panels in each furniture piece to blend with the veneer; (h) spraying a barrier coat onto the exposed machined portions to seal the exposed machined portions; (i) spraying a number of coats of polish onto each furniture piece, passing the furniture piece through a drying tunnel after each coat of polish is applied to dry the polish; (j) denibbling the furniture piece; and (k) spraying a top coat of polish onto each furniture piece in a pressurised spraying booth and drying the top coat by passing the furniture piece through a drying tunnel.

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#### Equivalent Abstract Text - ABEQ (1):

A furniture mfg. method comprising the steps (a) cutting one or more sheets of medium density fibre **board** to form a panel or panels of a pre-set desired size; (b) applying sheets of veneer to outer faces of each panel, the veneer sheets being attached to each panel with adhesive and heated under pressure for a preset period to cure the adhesive securely bonding the veneer sheets to the panel; (c) trimming away excess material from each panel; (d) machining each panel by profiling at least portion of a peripheral edge of the panel and/or shaping a front face of the panel; (e) sanding the profiled edge of each panel with a rotary **sanding device having a grinding** face shaped to correspond to the

profiled edge of the panel; (f) delivering the panels for assembly into furniture pieces; (g) staining exposed machined portions of panels in each furniture piece to blend with the veneer; (h) spraying a barrier coat onto the exposed machined portions to seal the exposed machined portions; (i) spraying a number of coats of polish onto each furniture piece, passing the furniture piece through a drying tunnel after each coat of polish is applied to dry the polish; (j) denibbling the furniture piece; and (k) spraying a top coat of polish onto each furniture piece in a pressurised spraying booth and drying the top coat by passing the furniture piece through a drying tunnel.

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(51) INT CL<sup>5</sup>

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B5L L18

(56) Documents cited

GB 2165184 A US 4853062 A

(58) Field of search

UK CL (Edition K) B5L, E1J

INT CL<sup>5</sup> B27D, B27M

(54) Method for manufacturing furniture

(57) Panels (1) for furniture construction formed from medium density fibreboard (MDF) sheets with a veneered front face (2) and rear face (3) and are machined to any desired shape. Decorative designs (14) and profiled edges (5, 12) may be cut in the panels (1). Glass or mirror panels (7) can be mounted in rebated holes (6) formed in the panels (1) and retained in place by a flexible retaining strip (10). MDF exposed during machining of the panels (1) is stained to blend with the veneer and treated with a sealant to prevent reaction with solvents in polish subsequently applied to the furniture piece.

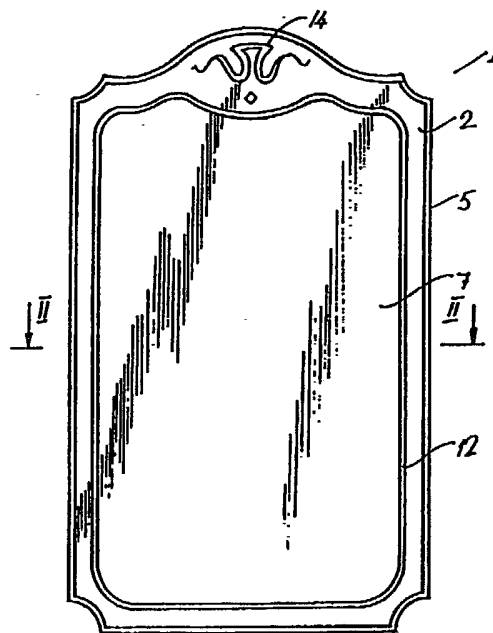


Fig.1

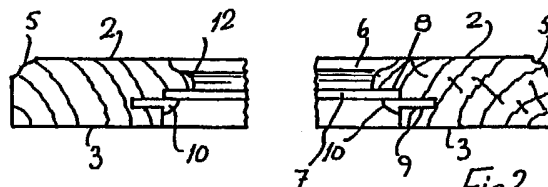


Fig.2

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

This print takes account of replacement documents submitted after the date of the filing to enable the application to comply with the formal requirements of the Patents Rules 1990.

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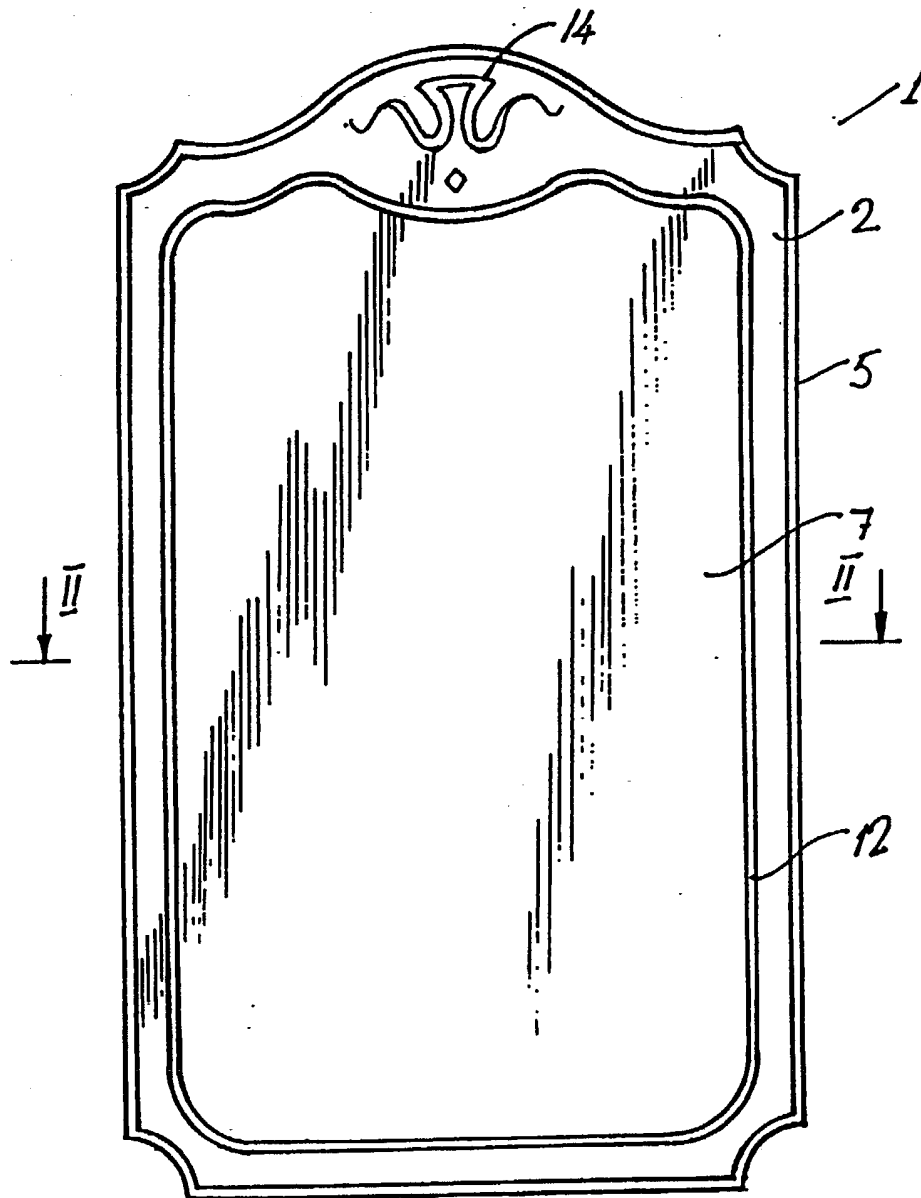


Fig. 1

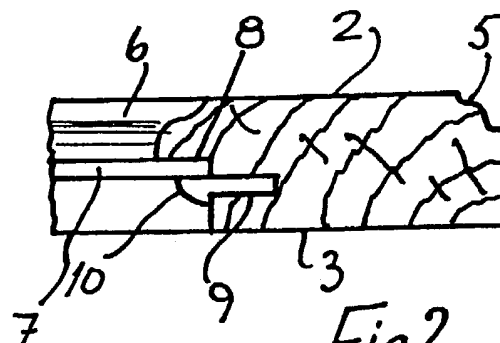
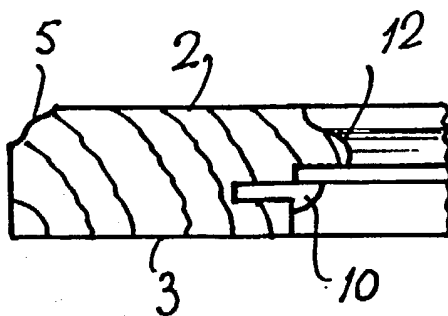


Fig. 2

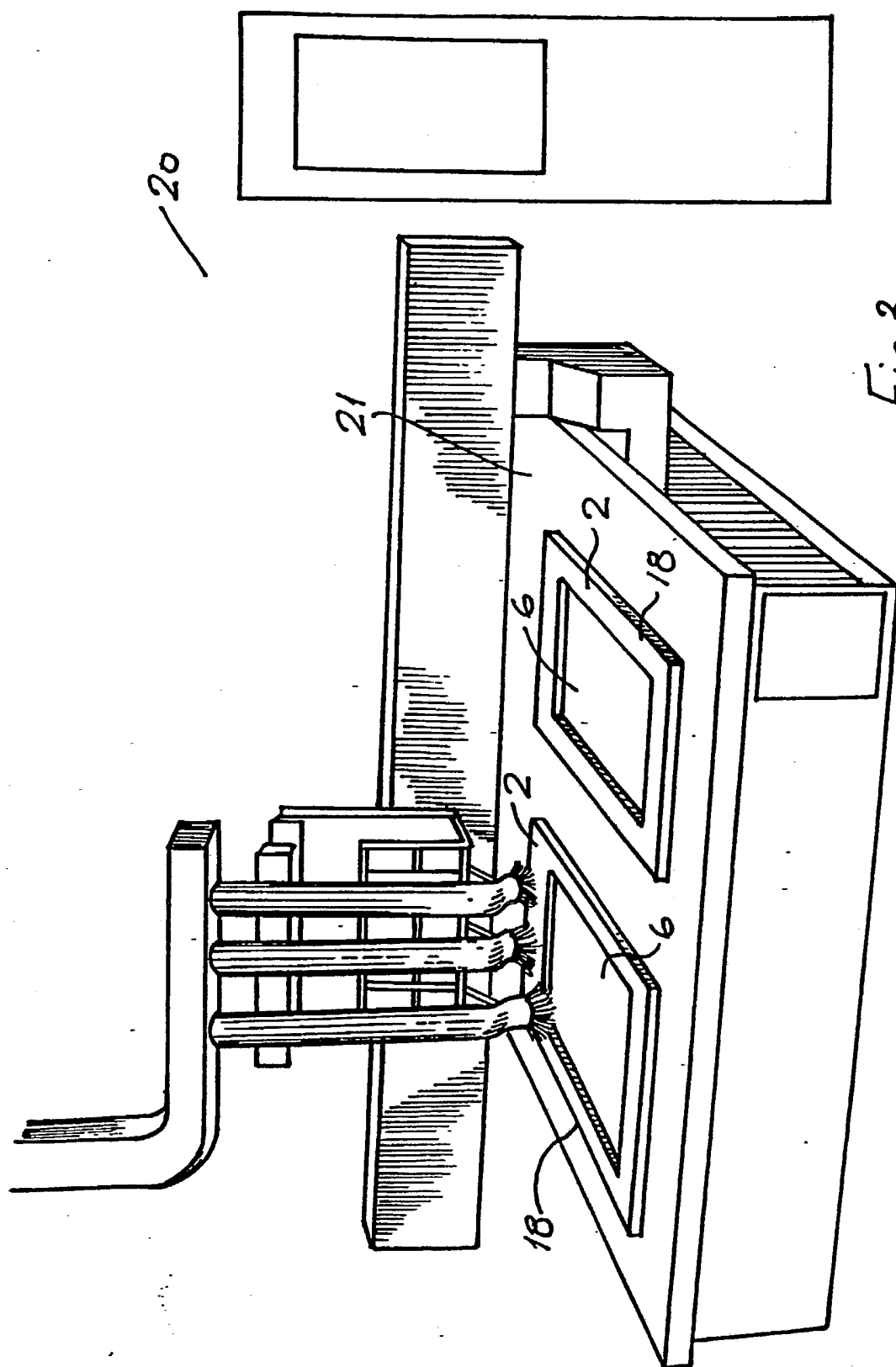


Fig. 3

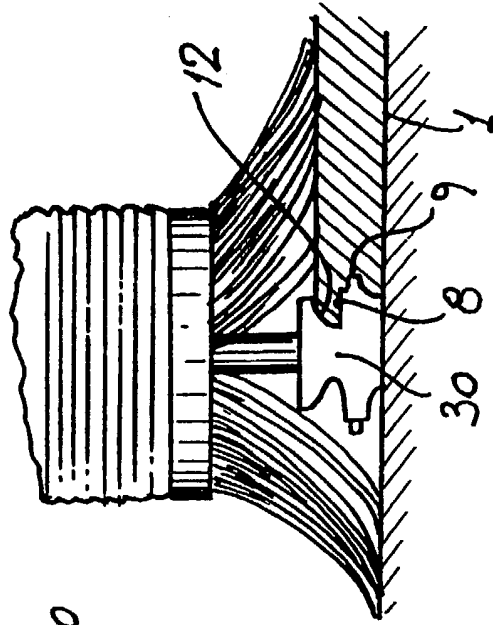


Fig. 5

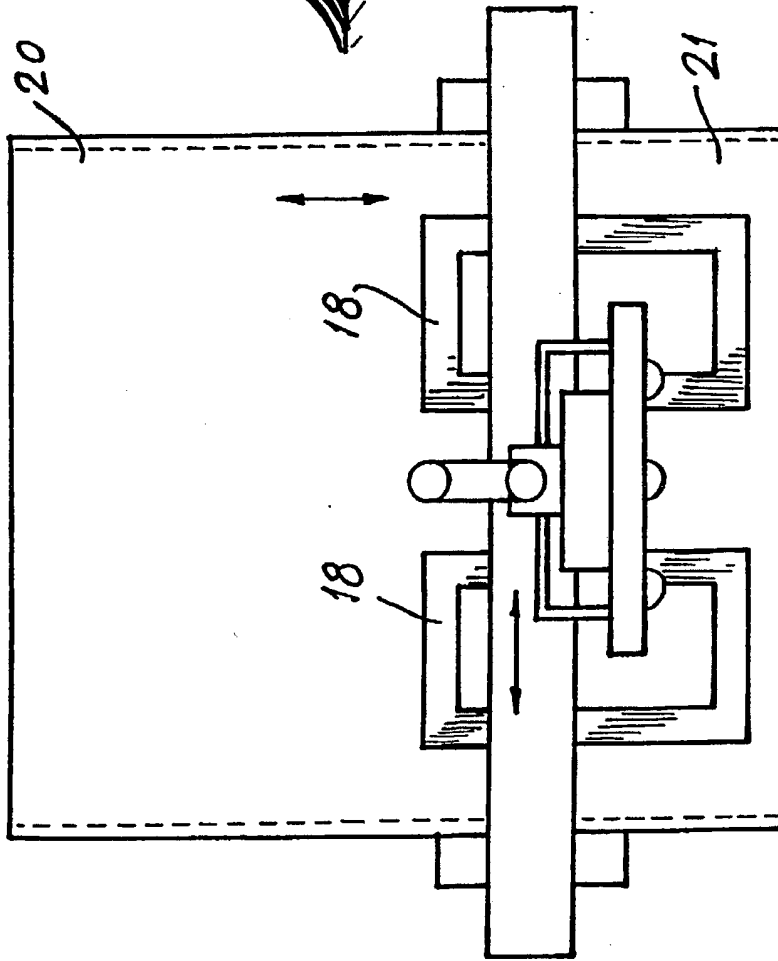


Fig. 4

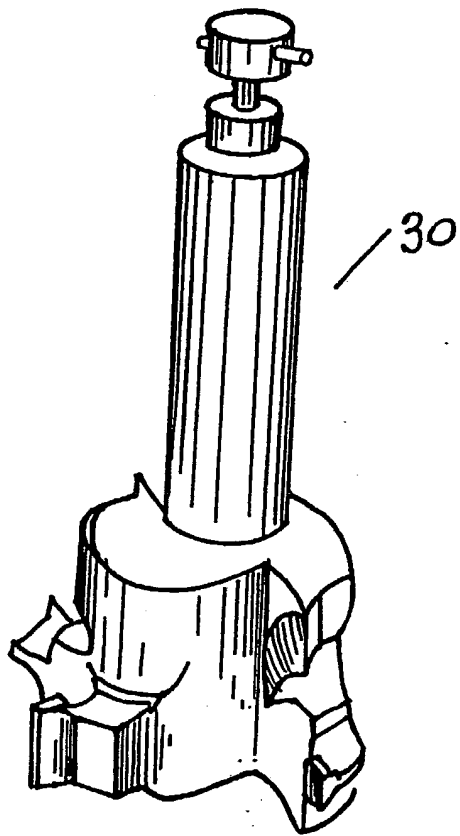


Fig. 7

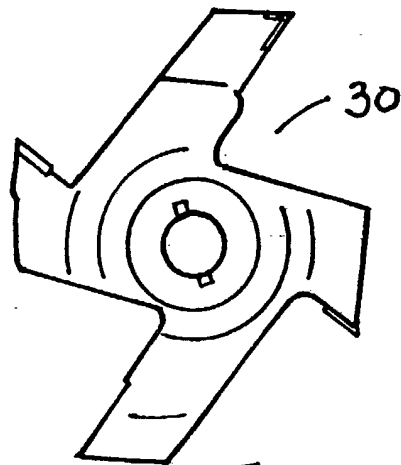


Fig. 8

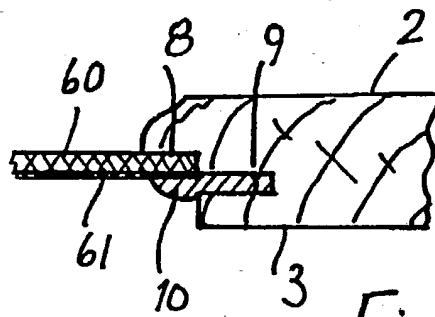


Fig. 11

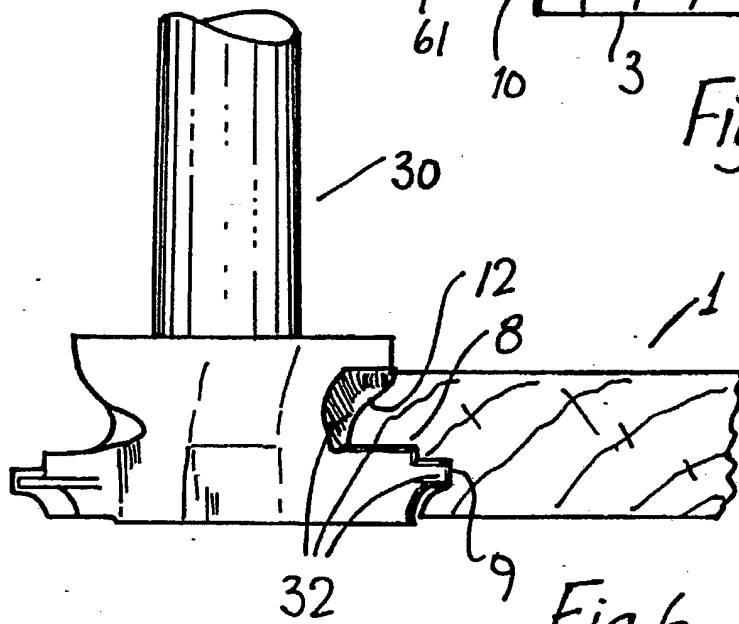
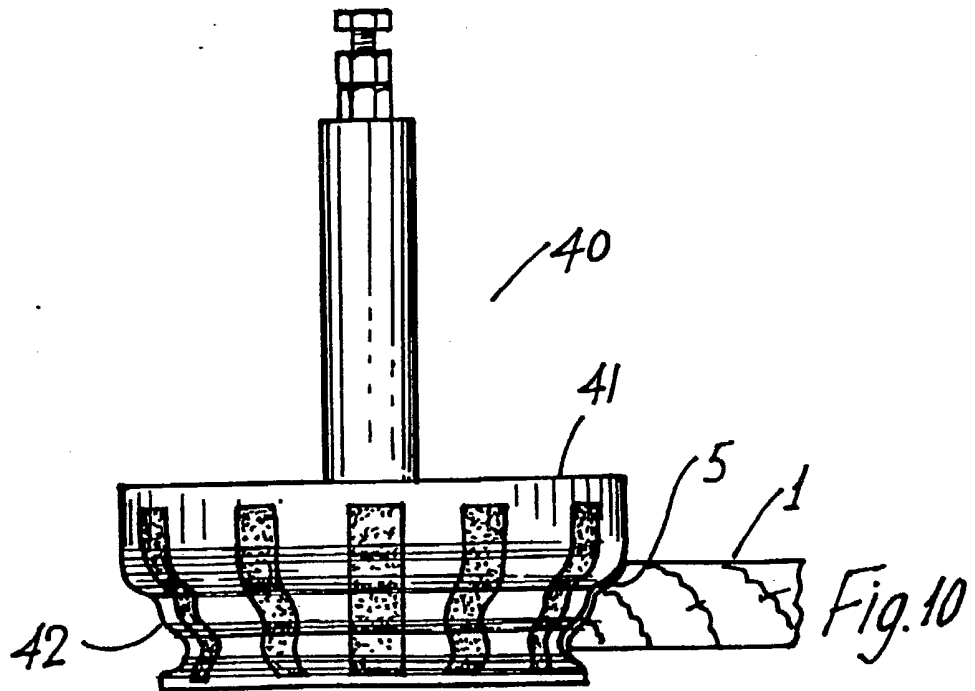
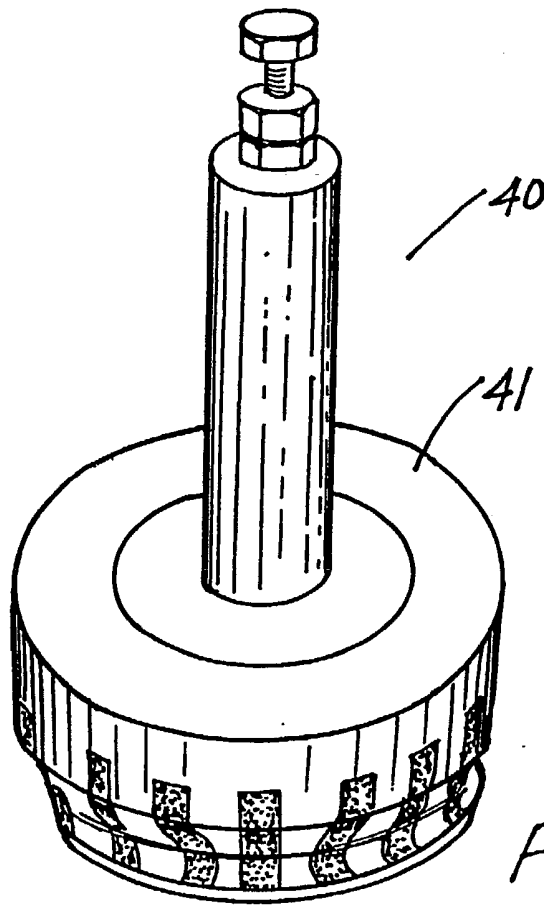
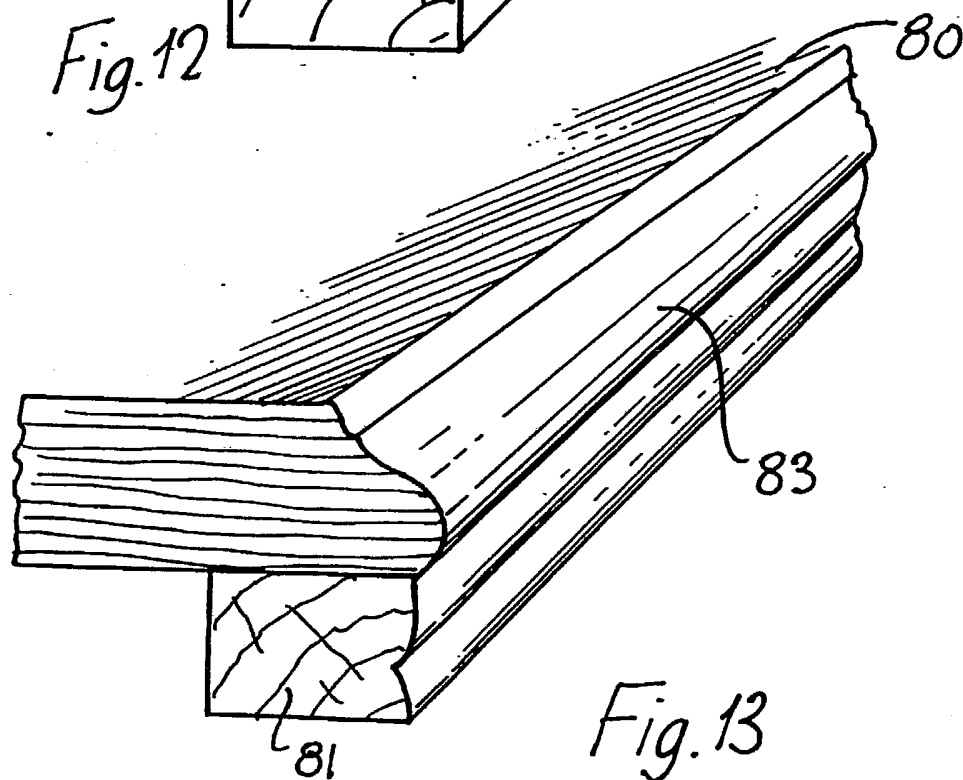
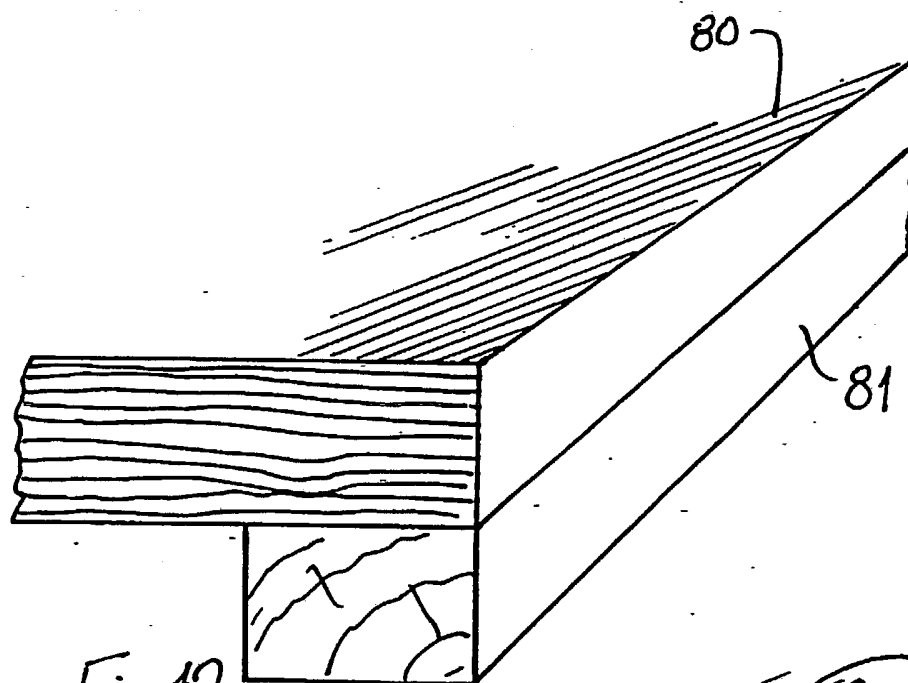
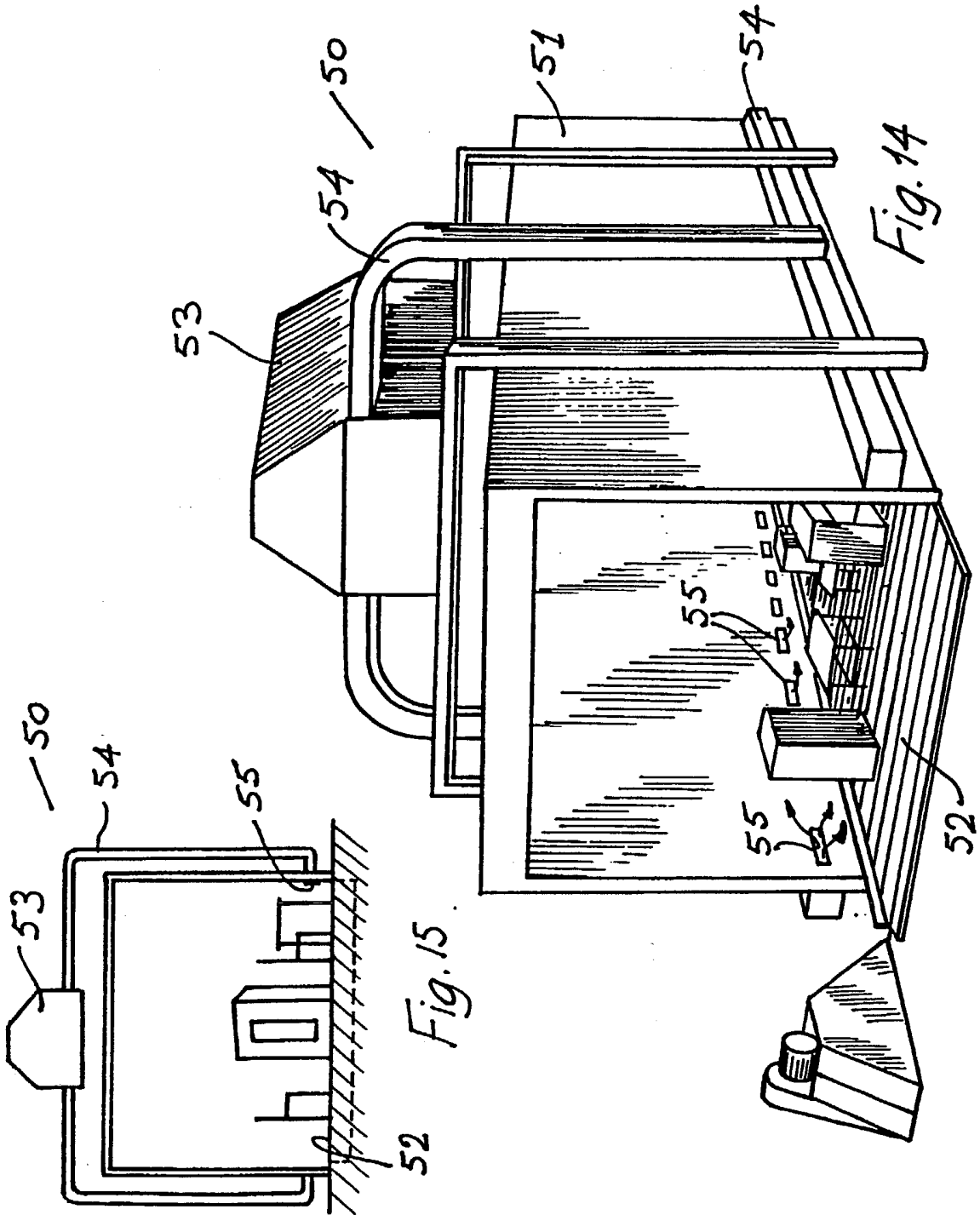


Fig. 6









- 1 -

"A Method of Furniture Manufacture"

This invention relates to an improved method for manufacturing furniture.

For the production of high quality furniture natural woods are  
5 used. However, the use of natural woods has a number of  
disadvantages. It is relatively expensive, particularly  
hardwoods and the use of hardwoods is being discouraged due  
to the depletion of this natural resource. Carving designs in  
natural wood presents difficulties due to the grain of the  
10 wood. This grain problem also means that furniture manufacture  
is relatively wasteful when using natural wood.

Glass panels are often provided in cabinets typically being  
received in a rebate and held in position by beading tacked  
into place. Care must be taken when applying the beading not  
15 to shatter the glass panel. Further the transport of the  
cabinets incorporating glass panels often leads to breakage of  
the glass panel. Replacement of the glass panel is an awkward  
and time consuming job.

Mirrors are commonly incorporated in dressing tables, wardrobes and the like. Typically, the mirrors are located in a rebate in a door frame for example and held in position by a backing panel tacked to the door frame. Again, care must be taken when  
5 fixing the backing panel to the door frame and during transport of the wardrobe and breakages are not uncommon. Unfortunately, to replace the mirror often the piece of furniture has to be returned to the factory and the replacement of the mirror panel is both difficult and time consuming.

10 The present invention is directed towards overcoming these and other problems associated with furniture manufacture.

According to the invention there is provided a furniture manufacturing method comprising the steps of:-

- 15 (a) cutting one or more sheets of medium density fibre board to form a panel or panels of a pre-set desired size;
- (b) applying sheets of veneer to outer faces of each panel, the veneer sheets being attached to each panel with adhesive and heated under pressure for a pre-  
20 set period to cure the adhesive securely bonding the veneer sheets to the panel;
- (c) trimming away excess material from each panel;

- (d) machining each panel by profiling at least portion of a peripheral edge of the panel and/or shaping a front face of the panel;
- 5 (e) sanding the profiled edge of each panel with a rotary sanding device having a grinding face shaped to correspond to the profiled edge of the panel;
- (f) delivering the panels for assembly into furniture pieces;
- 10 (g) staining exposed machined portions of the panels in each furniture piece to blend with the veneer;
- (h) spraying a barrier coat onto the exposed machined portions to seal the exposed machined portions;
- 15 (i) spraying a number of coats of polish onto the furniture piece, passing the furniture piece through a drying tunnel after each coat of polish is applied to dry the polish;
- (j) denibbling the furniture piece; and
- (k) spraying a top coat of polish onto each furniture piece in a pressurised spraying booth and drying the

top coat by passing the furniture piece through a drying tunnel.

In one embodiment of the invention the machining includes shaping a design on a front face of the panel by cutting a groove or grooves of varying depth in the front face of the panel.

In a further embodiment the machining includes the step of milling a continuous profiled track in a front face of the panel inset from a peripheral edge of the panel to give an inset panel effect.

In another embodiment the machining includes the step of cutting a hole in the panel, profiling a periphery of the hole, cutting a rebate adjacent the periphery of the hole for reception of an inlaid panel within the hole and cutting a slot adjacent the rebate for reception of a flexible retaining strip to hold the inlaid panel fast in the rebate.

In a particularly preferred embodiment the profiling of the hole periphery and cutting of the rebate and slot are carried out simultaneously.

In another embodiment the panel is for reception of a mirror in the rebate, and the method includes the step of applying a

plastics wood-effect adhesive backing sheet to a rear face of the mirror prior to mounting the mirror on the panel.

In a further embodiment the process includes the step of applying a strip of medium density fibre board around the periphery of the panel prior to profiling the peripheral edge of the panel.

The invention will be more clearly understood by the following description of some embodiments thereof, given by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is an elevational view of a door panel for a piece of furniture formed according to the method of the invention;

Fig. 2 is a sectional view taken along the line II-II of Fig. 1;

Fig. 3 is a perspective view of a shaping machine used to form the panel;

Fig. 4 is a plan view of the shaping machine;

Fig. 5 is a detail partially sectioned view of portion of the shaping machine in operation;



Fig. 6 is a detail partially sectioned view showing a shaping tool used with the shaping machine for forming the panel;

Fig. 7 is a perspective view of the shaping tool;

5      Fig. 8 is a plan view of the shaping tool;

Fig. 9 is a perspective view of a rotary sanding tool used with the shaping machine;

Fig. 10 is an elevational view of the sanding tool in use;

10      Fig. 11 is a detail view of portion of a mirror panel formed by the method of the invention;

Fig. 12 is a detail perspective view showing portion of another panel prior to shaping the panel;

15      Fig. 13 is a detail perspective view of the panel of Fig. 12 after shaping the panel;

Fig. 14 is a perspective view of a furniture drying tunnel used when manufacturing furniture according to the method; and

Fig. 15 is an end view of the drying tunnel.

Referring to the drawings and initially to Figs. 1 and 2 there is illustrated a door panel for a piece of furniture formed according to the method of the invention indicated generally by the reference numeral 1. The door panel 1 is of medium density fibre board having a veneered front face 2 and rear face 3. A periphery of the panel 1 has a profiled edge 5. The panel 1 has a central hole 6 within which is mounted a glass panel 7. A rebate 8 formed along an edge of the hole 6 receives the glass panel 7. Adjacent the rebate 8 is a slot 9. Mounted within the slot 9 is a plastics retaining strip 10 which projects outwardly of the slot 9 to engage a rear face of the glass panel 7, thus firmly retaining the glass panel 7 within the rebate 8. An outer portion 12 of the periphery of the hole 6 is profiled. At a top of the panel 1 a design 14 is cut into the front face 2, the design 14 being formed by a groove of varying depth.

The method of forming the panel 1 will now be described. A medium density fibre board (MDF) sheet is roughly cut to size. Sheets of veneer are applied to the front and rear faces of the MDF sheet. The veneer sheets are attached to the MDF sheet with adhesive and heated at a temperature of approximately 120°C under pressure for a pre-set period to cure the adhesive securely bonding the veneer sheets to the MDF sheet.

A pair of veneered MDF sheets 18 are mounted on a shaping machine 20 (Fig. 3) and retained on a flat bed 21 of the shaping machine 20 by vacuum. On the shaping machine 20 the centre portion of each MDF sheet 18 is cut out to form the  
5 hole 6. A profiled shaping tool also travels around an outer periphery of each MDF sheet 18 to form the profiled edge 5. The edge of the hole 6 at each panel is formed by a rotary cutting tool 30 which simultaneously forms the profiled edge 12, the rebate 8 and the slot 9. The tool 30 has diamond  
10 tipped cutting faces 32 for cutting the profiled edge 12, rebate 8 and slot 10 as shown in Figs. 5 and 6. A V-shaped diamond tipped milling tool (not shown) is controlled to cut the design 14 at a top of the panel 1, the milling tool being moved both horizontally and vertically to cut a groove of  
15 varying depth. Rotary sanding heads 40 (Figs. 9 and 10) on the shaping machine 20 are passed along the profiled edges 5, 12 on the panel 1 to give a smooth finish to the profiled edges 5, 12. It will be noted that each sanding head 40 has a rubber head 41 onto which is machined the negative shape of the  
20 required profile for the panel 1. Strips of elasticated abrasive paper 42 are adhesively attached to the head 41 for sanding the panels 1.

The shaped panels 1 are delivered for assembly into furniture pieces such as cabinets, wardrobes and the like. All the  
25 furniture pieces are of dowel and glue construction. When

glued the furniture pieces are clamped and allowed to set. The formed furniture pieces are delivered for staining and polishing. The exposed profiled edges of the various panels are stained to give them a colour-match with the veneer. The

5 stained furniture items are passed through a drying tunnel 50 (Figs. 14 and 15). The drying tunnel 50 comprises an elongate housing 51 of open ended construction. A continuously moving conveyor 52 passes through the housing 51, a burner and fan unit 53 on a top of the housing 51 direct hot air via ducting

10 54 to outlet holes 55 on an interior side wall of the housing 51 adjacent the conveyor 52. Temperature of the hot air stream within the housing 51 and the speed of the conveyor 52 are controlled such that the stained furniture items are just dry on reaching the exit end of the housing 51. A barrier coat is

15 applied to any exposed MDF on each furniture piece to seal the MDF and prevent a chemical reaction within solvents in polish to be applied at a later stage. After applying the barrier coat a first coat of polish is applied to the furniture items which are again passed through a drying tunnel 50. Transit

20 time through the drying tunnel is 25 minutes and a temperature gradient within the drying tunnel 50 is such that it rises to 30°C in the centre of the drying tunnel 50 and then cools down to ambient temperature at an exit end of the tunnel 50. The furniture pieces exiting the drying tunnel 50 have a second

25 coat of polish applied to them and are again passed through another drying tunnel 50 to dry the second coat of polish in similar fashion to the first coat of polish. Then the

furniture pieces are passed to a denibbling station where any raised grain due to the application of the polish is sanded. A final check on each furniture item and any touch-ups to the staining is carried out if necessary. Then a final polish coat  
5 is applied to each furniture item in a pressurised room to prevent dirt ingress. After passing through another drying tunnel furniture fittings such as handles, the glass panel 7 and the like are applied to the furniture pieces which are then packed and ready for delivery.

10 Fig. 11 shows portion of a mirror panel. The mirror panel is largely similar to the panel described previously with reference to Figs. 1 and 2 and like parts are assigned the same reference numerals. In this case instead of a glass sheet  
7 a mirror panel 60 is mounted in the rebate 8. Prior to  
15 mounting the mirror panel 60 in the rebate 8 a plastics backing sheet 61 having a wood effect is adhered to a rear face of the mirror panel 60.

Referring now to Figs. 12 and 13 there is illustrated a MDF panel for forming a table top. In this case a veneered MDF  
20 sheet 80 has an MDF strip 81 applied along an outer peripheral edge of the MDF sheet 80. Subsequent profiling of the outer edge of the MDF panel gives a profiled edge 83 giving an illusion of greater depth to the panel 80.

In some cases during manufacture of a panel an endless profiled track may be milled in a front face of the panel, inset from a peripheral edge of the panel to give an inset panel effect.

Medium density fibre board is very machinable and does not  
5 suffer from the problems associated with the grain in a natural wood. Relatively intricate profiles and designs can be shaped on the panels quickly and easily. Thus the process for producing furniture pieces can be carried out more quickly than a similar process using natural wood panels. Production  
10 can be increased and is also more efficient as there is less wastage with medium density fibre board than there would be with natural wood.

Preferably the medium density fibre board is composed of fine fibre material which is discrete enough not to show when the  
15 exposed machined edges of the panels are polished.

It will also be appreciated that the particular arrangement for mounting the glass and mirror panels on the machined medium density fibre board panels is particularly advantageous. The glass and mirror panels can be quickly and easily mounted on  
20 the medium density fibre board panels and secured with the plastics retaining strip which is flexible enough to follow around curved contours of the hole in the medium density fibre board panel. A further advantage of the plastics retaining strip is that it has a dampening effect which allows vibrations

set up in the panel to be absorbed without shattering the glass or the mirror. This is particularly important when transporting furniture pieces. In the event of any breakage of the glass or mirror panels they can be quickly and easily  
5 replaced. The plastics backing sheet applied to the rear of the mirror in addition to blending in the mirror with the rear of the panel also improves the safety of the mirror panel as it prevents the mirror from shattering.

The invention is not limited to the embodiments hereinbefore  
10 described which may be varied in both construction and detail.

CLAIMS

1. A furniture manufacturing method comprising the steps:-

- 5           (a) cutting one or more sheets of medium density fibre board to form a panel or panels of a pre-set desired size;
- 10           (b) applying sheets of veneer to outer faces of each panel, the veneer sheets being attached to each panel with adhesive and heated under pressure for a pre-set period to cure the adhesive securely bonding the veneer sheets to the panel;
- (c) trimming away excess material from each panel;
- (d) machining each panel by profiling at least portion of a peripheral edge of the panel and/or shaping a front face of the panel;
- 15           (e) sanding the profiled edge of each panel with a rotary sanding device having a grinding face shaped to correspond to the profiled edge of the panel;
- (f) delivering the panels for assembly into furniture pieces;



- (g) staining exposed machined portions of panels in each furniture piece to blend with the veneer;
  - (h) spraying a barrier coat onto the exposed machined portions to seal the exposed machined portions;
  - 5 (i) spraying a number of coats of polish onto each furniture piece, passing the furniture piece through a drying tunnel after each coat of polish is applied to dry the polish;
  - (j) denibbling the furniture piece; and
  - 10 (k) spraying a top coat of polish onto each furniture piece in a pressurised spraying booth and drying the top coat by passing the furniture piece through a drying tunnel.
2. A method as claimed in claim 1 wherein the machining
- 15 includes the step of shaping a design on the front face of the panel by cutting a groove or grooves of varying depth in the front face of the panel.
3. A method as claimed in claim 1 or claim 2 wherein the machining includes the step of milling a profiled track
- 20 in a front face of the panel inset from a peripheral edge of the panel to give an inset panel effect.

4. A method as claimed in claim 1 or claim 2 wherein the machining includes the step of cutting a hole in the panel, profiling a periphery of the hole, cutting a rebate adjacent the periphery of the hole for reception of an  
5 inlaid panel within the hole and cutting a slot adjacent the rebate for reception of a flexible retaining strip to hold the inlaid panel fast in the rebate.
5. A method as claimed in claim 4 wherein the profiling of the hole periphery and the cutting of the rebate and slot  
10 are carried out simultaneously.
6. A method as claimed in claim 4 or 5 wherein the panel is for reception of a mirror in the rebate, and includes the step of applying a plastics wood-effect adhesive backing sheet to a rear face of the mirror prior to mounting the  
15 mirror on the panel.
7. A method as claimed in claim 1 wherein the process includes the step of applying a strip of medium density fibre board around a periphery of the panel prior to profiling the peripheral edge of the panel.
- 20 8. A method substantially as hereinbefore described with reference to the accompanying drawings.

9. A furniture piece whenever produced by the method of any preceding claim.

- 17 -

**Patents Act 1977**  
**Examiner's report to the Comptroller under**  
**Section 17 (The Search Report)**

Application number

9122717.3

**Relevant Technical fields**

- (i) UK Cl (Edition K ) B5L; E1J
- (ii) Int Cl (Edition 5 ) B27D; B27M

Search Examiner

R HOWE

**Databases (see over)**

(i) UK Patent Office

(ii)

Date of Search

19 DECEMBER 1991

Documents considered relevant following a search in respect of claims

1-9

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2165184 A (HEWKIN)	1
A	US 4853062 A (GARTLAND)	1

SF2(p)

kg - c:\wp51\doc99\fil000486

Category	Identity of document and relevant passages	Relevant to claim(s).

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